


VERIFICATION OF TRANSLATION

I, Sumiyo Yamamoto
of 1950 Roland Clarke Place
Reston, VA 20191

declare that I am well acquainted with both the Japanese and English languages, and that the attached is an accurate translation, to the best of my knowledge and ability, of the Japanese language Patent Application No. 2001-026646, filed February 2, 2001.

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[Inventor]	
[Address or Residence]	c/o Matsushita Graphic Communication Systems, Inc., 2-3-8 Meguro, Meguro-ku, Tokyo
[Name]	Yutaka Ioki
[Patent Applicant]	
[Identification Number]	000187736
[Name or Title]	Matsushita Graphic Communication Systems
[Agent]	
[Identification Number]	100105050
[Patent Agent]	
[Name or Title]	Kimihito Washida
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[Name of the Invention] IMAGE INFORMATION TRANSMITTING SYSTEM,
SCANNER APPARATUS AND USER TERMINAL APPARATUS, AND METHOD FOR
REGISTERING USER TERMINAL INFORMATION TO SCANNER APPARATUS

[Claims]

1. An image information transmitting system comprising one or two or more scanner apparatuses and one or two or more user terminal apparatuses, the scanner apparatuses and the user terminal apparatuses being connected to a network, the image information transmitting system directly transmitting image information which is scanned from a document by the scanner apparatus to the user terminal apparatus to which an IP address called up from memory of the scanner apparatus by a user is assigned,

wherein said user terminal apparatus broadcasts a search signal on said network, said scanner apparatus sends back a response signal including an IP address of said scanner apparatus to said user terminal apparatus when monitoring said search signal so as to receive said search signal, said user terminal apparatus transmits user terminal information including at least an IP address of said user terminal apparatus to the IP address of said scanner apparatus when receiving said response signal, and said scanner apparatus receives said user terminal information and stores said received user terminal information to said memory.

2. The image information transmitting system according to claim 1, wherein said user terminal information includes a password other than the IP address of said user terminal apparatus, said scanner apparatus stores said IP address and said password to said memory to be associated with each other, and when the user calls up said IP address to instruct transmission of image information, said scanner apparatus transmits said image information to said user terminal apparatus when a password entered according to a request for inputting a password matches said password associated with said IP address.

3. The image information transmitting system according to one of claims 1 and 2, wherein said search signal includes belonging information of said user terminal apparatus, and said scanner apparatus sends back said response signal when said belonging information is compared with belonging information of said scanner apparatus and both match each other.

4. The image information transmitting system according to one of claims 1 to 3, wherein said user terminal information includes a user name other than the IP address of said user terminal apparatus, said scanner apparatus stores said IP address and said user name to said memory to be associated with each other, and when the user inputs said user name, said scanner apparatus calls up the IP address associated with said input user name from said memory.

5. A scanner apparatus comprising:
a scanner section which scans a document to obtain image information;
memory which stores an IP address assigned to one or two or more user terminal apparatuses connected to a network; and
an image information transmitting section which directly transmits said image information to said user terminal apparatus to which the IP address called up from said memory by a user is assigned,

wherein said scanner apparatus monitors a search signal broadcasted on said network from said user terminal apparatus, sends back a response signal including an IP address of said scanner apparatus to said user terminal apparatus when receiving said search signal, and receives user terminal information including at least an IP address of said user terminal apparatus transmitted to the IP address of said scanner apparatus from said user terminal apparatus and stores said received user terminal information to said memory.

6. The scanner apparatus according to claim 5, wherein said user terminal information includes a password other than the IP address of said user terminal apparatus, said scanner apparatus stores said IP address and said password to said memory to be associated with each other, and when a user calls up said IP address to instruct transmission of image information, said scanner apparatus transmits said image information to said user terminal apparatus when a password entered according to a

request for inputting a password matches said password associated with said IP address.

7. The scanner apparatus according to one of claims 5 and 6, wherein said search signal includes belonging information of said user terminal apparatus, and said scanner apparatus sends back said response signal when said belonging information is compared with belonging information of said scanner apparatus and both match each other.

8. The scanner apparatus according to claims one of 5 to 7, wherein said user terminal information includes a user name other than the IP address of said user terminal apparatus, and said scanner apparatus stores said IP address and said user name to said memory to be associated with each other, and when the user inputs said user name, said scanner apparatus calls up the IP address associated with said input user name from said memory.

9. A user terminal apparatus comprising:
an image information receiving section which receives image information transmitted from one or two or more scanner apparatuses connected via a network; and
an image information storing section which stores said image information,
wherein when said user terminal apparatus broadcasts a search signal on said network and receives a response signal including an IP address of said scanner apparatus sent back by said scanner apparatus that has received said search signal, said user terminal apparatus transmits user terminal information including at least an IP address of said user terminal apparatus to the IP address of said scanner apparatus.

10. The user terminal apparatus according to claim 9, wherein said user terminal apparatus transmits said user terminal information in which a password other than the IP address of said user terminal apparatus is included.

11. The user terminal apparatus according to one of claims 9 and 10, wherein said user terminal apparatus transmits said search signal in which belonging information of said user terminal apparatus is included.

12. The user terminal apparatus according to one of claims 9 to 11, wherein said user terminal apparatus transmits said user terminal information in which a user name other than the IP address of said user terminal apparatus is included.

13. A method for registering user terminal information to a scanner apparatus comprising:

- broadcasting a search signal on a network from a user terminal apparatus;
- sending back a response signal including an IP address of a scanner apparatus to said user terminal apparatus when said scanner apparatus monitors said search signal and receives said search signal;
- transmitting user terminal information including at least an IP address of said user terminal apparatus to the IP address of said scanner apparatus when said user terminal apparatus receives said response signal; and
- receiving said user terminal information by said scanner apparatus so as to store said received user terminal information to memory.

14. The method for registering the user terminal information to the scanner apparatus according to claim 13, wherein said user terminal information includes a password other than the IP address of said user terminal apparatus, said scanner apparatus stores said IP address and said password to said memory to be associated with each other, and when a user calls up said IP address to instruct transmission of image information, said scanner apparatus transmits said image information to said user terminal apparatus when a password entered according to a request for inputting a password matches said password associated with said IP address.

15. The method for registering the user terminal information to the scanner apparatus according to one of claims 13 and 14, wherein said search signal includes belonging information of said user terminal apparatus, and said scanner apparatus sends back said response signal when said belonging information is compared with belonging information of said scanner apparatus and both match each other.

16. The method for registering the user terminal information to the scanner apparatus according to one of claims 13 to 15, wherein said user terminal information includes a user name other than the IP address of said user terminal apparatus, said scanner apparatus stores said IP address and said user name to said memory to be associated with each other, and when the user inputs said user name, said scanner apparatus calls up the IP address associated with said input user name from said memory.

[Detail Description of the Invention]

[Technical Field of the Invention]

[0001] The present invention relates to an image information transmitting system, a scanner apparatus and a user terminal apparatus, and a method for registering user terminal information to the scanner apparatus.

[Background Technology]

[0002] In the conventional network scanners, there is one that uses an e-mail transfer protocol such as SMTP (Simple Mail Transfer Protocol) in performing communication with personal computers (PC). In this case, image information scanned by the network scanner is converted into a file such as a TIFF file and the like and the resultant is attached to an e-mail message.

[0003] In order to transmit the e-mail message to PC using SMTP, there are two routes, including a route in which the e-mail message is directly transmitted to PC and a route in which the e-mail message is transmitted via a mail server. An image scanner which converts a paper document, which is analog information, into digital image data and stores the converted image data in PC is required to have real time characteristics, and thus the former route is preferable.

[Shortcomings Resolved by the Invention]

[0004] However, in order to transmit the e-mail message directly to PC using SMTP, it is necessary to use an IP address of PC. Accordingly, a user must check an IP address of user's own PC. However, knowledge about the network and PC is required to some extent when the user checks it by oneself, and this forces the user to perform complicated operations.

[0005] Moreover, it can be considered to reduce time and effort to input addresses by registering an IP address of PC or the like, which is a transmission destination of image information, to the network scanner and by calling up an IP address of an arbitrary PC from the content of registration at a transmitting time (scanning time). However, even if this method is used, the user must check the IP address of PC and manually input the IP address at least once.

[0006] Still moreover, in view of the effective use of IP addresses, a DHCP server has recently been used to assign an IP address to a network terminal automatically. On a network controlled by the DHCP server, the IP address to be assigned to PC is different every time startup occurs. Accordingly, the need arises for the user to check the user's own IP address every time the network scanner is used. Further, the need arises for the user to change the registration content of the network scanner.

[0007] In addition to SMTP, a protocol by which image information is directly transmitted to PC from the network scanner can be used, but the same problem as mentioned above also occurs in this case.

[0008] The present invention is provided to overcome the above-described shortcomings. An object of the present invention is to provide an image information transmitting system, a scanner apparatus and a user terminal apparatus, which are capable of easily registering user terminal information such as an IP address of a user terminal apparatus, and a method for registering the user terminal information to the scanner apparatus.

[Means for Resolving the Shortcomings]

[0009] In order to address the shortcomings above, the scanner apparatus receives a search signal broadcasted on a network from the user terminal apparatus, sends back a response signal including at least an IP address of the scanner apparatus to the user terminal apparatus, receives user terminal information including at least an IP address of the user terminal apparatus sent back to the IP address of the scanner apparatus from the user terminal apparatus, and stores the user terminal information to memory.

[0010] This makes it possible for the user of the user terminal apparatus to register the user terminal information such as the IP address of the user terminal apparatus to the scanner apparatus without checking the IP address by oneself.

[Description of the Preferred Embodiments]

[0011] In order to address the shortcomings above, the present invention provides an image information transmitting system that includes one or two or more scanner apparatuses and one or two or more user terminal apparatuses, the scanner apparatuses and the user terminal apparatuses being connected to a network, the image information transmitting system directly transmitting image information which is

scanned from a document by the scanner apparatus to the user terminal apparatus to which an IP address called up from memory of the scanner apparatus by a user is assigned. In the image information transmitting system, the user terminal apparatus broadcasts a search signal on the network; the scanner apparatus sends back a response signal including an IP address of the scanner apparatus to the user terminal apparatus when monitoring the search signal so as to receive the search signal; the user terminal apparatus transmits user terminal information including at least an IP address of the user terminal apparatus to the IP address of the scanner apparatus when receiving the response signal; and the scanner apparatus receives the user terminal information and stores the received user terminal information to the memory.

[0012] The configuration allows the user to easily and surely register the user terminal information to the scanner apparatus, without checking the IP addresses of the user terminal apparatus and the scanner apparatus, even when the user has limited knowledge on computers or networks. After registration, the user can transmit the image information to the user terminal apparatus to which the IP address is assigned, by calling up the IP address from the memory of the scanner apparatus and providing an instruction to scan the document, thus eliminating an effort to enter the IP address when scanning the document.

[0013] In the present invention, the user terminal information may include a password other than the IP address of the user terminal apparatus; the scanner apparatus may store the IP address and the password to the memory to be associated with each other; and when the user calls up the IP address to instruct transmission of the image information, the scanner apparatus may transmit the image information to the user terminal apparatus when a password entered according to a request for inputting a password matches the password associated with the IP address.

[0014] The configuration, in which the password is verified prior to transmission of the image information, permits the transmission of the image information only when the passwords are identical, thereby preventing the image information from being transmitted to the user terminal apparatus without confirmation.

[0015] Further in the present invention, the search signal may include belonging information of the user terminal apparatus, and the scanner apparatus may send back

the response signal when the belonging information is compared with belonging information of the scanner apparatus and both match each other.

[0016] The configuration allows, for example, installation of a plurality of scanner apparatuses on one network, so as to be used separately according to the belonging of the user terminal apparatus, while requiring no user's attention to the separate use when the user registers user information.

[0017] Further in the present invention, the user terminal information may include a user name other than the IP address of the user terminal apparatus; the scanner apparatus may store the IP address and the user name to the memory to be associated with each other; and when the user inputs the user name, the scanner apparatus may call up the IP address associated with the input user name from the memory.

[0018] The configuration, in which the IP address and the user name are stored in the memory while being associated with each other, allows the user to use the user name, instead of the IP address which is difficult to identify, in order to call up the IP address when scanning the document, and thereby allows the user to perform an operation more easily.

[0019] Further, the present invention provides a scanner apparatus that includes a scanner section which scans a document to obtain image information; memory which stores an IP address assigned to one or two or more user terminal apparatuses connected to a network; and an image information transmitting section which directly transmits the image information to the user terminal apparatus to which the IP address called up from the memory by a user is assigned. The scanner apparatus monitors a search signal broadcasted on the network from the user terminal apparatus, sends back a response signal including an IP address of the scanner apparatus to the user terminal apparatus when receiving the search signal, and receives user terminal information including at least an IP address of the user terminal apparatus transmitted to the IP address of the scanner apparatus from the user terminal apparatus and stores the received user terminal information to the memory.

[0020] The configuration allows the user to easily and surely register the user terminal information to the scanner apparatus, without checking the IP addresses of the user terminal apparatus and the scanner apparatus, even when the user has limited

knowledge on computers or networks. After registration, the user can transmit the image information to the user terminal apparatus to which the IP address is assigned, by calling up the IP address of the user terminal apparatus from the memory of the scanner apparatus and providing an instruction to scanning the document, thus eliminating an effort to enter the IP address when scanning the document.

[0021] In the present invention, the user terminal information may include a password other than the IP address of the user terminal apparatus; the scanner apparatus may store the IP address and the password to the memory to be associated with each other; and when the user calls up the IP address to instruct transmission of the image information, the scanner apparatus may transmit the image information to the user terminal apparatus when a password entered according to a request for inputting a password matches the password associated with the IP address.

[0022] The configuration, in which the password is verified prior to transmission of the image information, permits the transmission of the image information only when the passwords are identical, thereby preventing the image information from being transmitted to the user terminal apparatus without confirmation.

[0023] In the present invention, the search signal may include belonging information of the user terminal apparatus, and the scanner apparatus may send back the response signal when the belonging information is compared with belonging information of the scanner apparatus and both match each other.

[0024] The configuration allows, for example, installation of a plurality of scanner apparatuses on one network, so as to be used separately according to the belonging of the user terminal apparatus, while requiring no user's attention to the separate use when the user registers user information.

[0025] In the present invention, the user terminal information may include a user name other than the IP address of the user terminal apparatus; the scanner apparatus may store the IP address and the user name to the memory to be associated with each other; and when the user inputs the user name, the scanner apparatus may call up the IP address associated with the input user name from the memory.

[0026] The configuration, in which the IP address and the user name of the user terminal apparatus are stored in the memory while being associated with each other,

allows the user to use the user name, instead of the IP address which is difficult to identify, in order to call up the IP address when scanning the document, and thereby allows the user to perform an operation more easily.

[0027] Further, the present invention provides a user terminal apparatus that includes an image information receiving section which receives image information transmitted from one or two or more scanner apparatuses connected via a network; and an image information storing section which stores the image information. When the user terminal apparatus broadcasts a search signal on the network and receives a response signal including an IP address of the scanner apparatus sent back by the scanner apparatus that has received the search signal, the user terminal apparatus transmits user terminal information including at least an IP address of the user terminal apparatus to the IP address of the scanner apparatus.

[0028] The configuration allows a user to easily and surely register the user terminal information to the scanner apparatus, without checking the IP addresses of the user terminal apparatus and the scanner apparatus, even when the user has limited knowledge on computers or networks. After registration, the user can transmit the image information to the user terminal apparatus to which the IP address is assigned, by calling up the IP address from the memory of the scanner apparatus and providing an instruction to scan the document, thus eliminating an effort to enter the IP address when scanning the document.

[0029] In the present invention, the user terminal information that includes a password other than the IP address of the user terminal apparatus may be transmitted.

[0030] The configuration, in which the password is verified prior to transmission of the image information, permits the transmission of the image information only when the passwords are identical, thereby preventing the image information from being transmitted to the user terminal apparatus without confirmation.

[0031] In the present invention, the search signal that includes belonging information of the user terminal apparatus may be transmitted.

[0032] The configuration allows, for example, installation of a plurality of scanner apparatuses on one network, so as to be used separately according to the belonging of

the user terminal apparatus, while requiring no user's attention to the separate use when the user registers user information.

[0033] In the present invention, the user terminal information that includes a user name other than the IP address of the user terminal apparatus may be transmitted.

[0034] The configuration, in which the IP address and the user name are stored in the memory while being associated with each other, allows the user to use the user name, instead of the IP address which is difficult to identify, in order to call up the IP address when scanning the document, and thereby allows the user to perform an operation more easily.

[0035] Further, the present invention provides a method for registering user terminal information to a scanner apparatus. The method that includes broadcasting a search signal on a network from a user terminal apparatus; sending back a response signal including an IP address of a scanner apparatus to the user terminal apparatus when the scanner apparatus monitors the search signal and receives the search signal; transmitting user terminal information including at least an IP address of the user terminal apparatus to the IP address of the scanner apparatus to the scanner apparatus when the user terminal apparatus receives the response signal; and receiving the user terminal information by the scanner apparatus so as to store the received user terminal information to memory.

[0036] The method allows a user to easily and surely register the user terminal information to the scanner apparatus, without checking the IP addresses of the user terminal apparatus and the scanner apparatus, even when the user has limited knowledge on computers or networks. After registration, the user can transmit the image information to the user terminal apparatus to which the IP address is assigned, by calling up the IP address from the memory of the scanner apparatus and providing an instruction to scan the document, thus eliminating an effort to enter the IP address when scanning the document.

[0037] In the present invention, the user terminal information may include a password other than the IP address of the user terminal apparatus; the scanner apparatus may store the IP address and the password to the memory to be associated with each other; and when the user calls up the IP address to instruct transmission of the image

information, the scanner apparatus may transmit the image information to the user terminal apparatus when a password entered according to a request for inputting a password matches the password associated with the IP address.

[0038] The method, in which the password is verified prior to transmission of the image information, permits the transmission of the image information only when the passwords are identical, thereby preventing the image information from being transmitted to the user terminal apparatus without confirmation.

[0039] In the present invention, the search signal may include belonging information of the user terminal apparatus, and the scanner apparatus may send back the response signal when the belonging information is compared with belonging information of the scanner apparatus and both match each other.

[0040] The configuration allows, for example, installation of a plurality of scanner apparatuses on one network, so as to be used separately according to the belonging of the user terminal apparatus, while requiring no user's attention to the separate use when the user registers user information.

[0041] In the present invention, the user terminal information may include a user name other than the IP address of the user terminal apparatus; the scanner apparatus may store the IP address and the user name to the memory to be associated with each other; and when the user inputs the user name, the scanner apparatus may call up the IP address associated with the input user name from the memory.

[0042] The configuration, in which the IP address and the user name are stored in the memory while being associated with each other, allows the user to use the user name, instead of the IP address which is difficult to identify, in order to call up the IP address when scanning the document, and thereby allows the user to perform an operation more easily.

[0043] A preferred embodiment of the present invention will be specifically described with reference to the accompanying drawings herewith.

FIG. 1 is a schematic view illustrating a network system where a network scanner operates according to one embodiment of the present invention.

A plurality of network scanners 2 and a plurality of PCs 3, which are user terminals each using the network scanner, are connected to a network 1 such as LAN.

[0044] FIG. 2 is a block diagram illustrating functions of the network scanner according to the above embodiment.

In the network scanner 2, a scanner section 11 scans a document to obtain an image signal. An image file generating section 12 generates an image file from the image signal output by the scanner section 11. A data format of the image file may be, for example, TIFF, GIF, JPEG and the like, and TIFF is used in this example. A file managing section 13 stores this image file 14 to a storage section 15.

[0045] A network communication section 16 is connected to a network 1 by a network connection interference circuit (not shown) to perform communication with PC3 via network 1. In the network communication section 16, an Lpd transmitting section 17 executes an Lpr/Lpd protocol between an Lpd receiving section 33 of PC3 to be described later and the Lpd transmitting section 17. A file transmitting section 18 executes processing for transferring the image file 14 to PC3 using the file managing section 13 based on this Lpr/Lpd protocol procedure.

[0046] Moreover, in the network communication section 16, a search packet receiving section 19 receives a search packet transmitted by PC3 to be described later. A search response packet transmitting section 20 transmits a search response packet, which is a response to the search packet received by the search packet receiving section 19, to PC3.

[0047] Moreover, a registration packet receiving section 21 receives a registration packet transmitted by PC3 to be described later. On the other hand, a registration response packet transmitting section 22 transmits a registration response packet, serving as a response to the registration packet, to PC3.

The forgoing functions of the respective sections of the network communication section 16 are implemented by software executed by CPU in this example, but they are not limited to this.

[0048] An address notebook managing section 23 manages address notebook data 24 in which user terminal information is registered to be described later. A control panel 25 is used to read out an IP address of a transmission destination from the address notebook data 24 or to manually input an IP address in an unregistered case.

[0049] FIG. 3 is a block diagram illustrating functions of the personal computer according to the above embodiment.

PC3 executes a network scanner controller application 31 that controls image scanning processing using the network scanner 2. In this network scanner controller application 31, a network communication section 32 performs communication with the network scanner 2. In this network communication section 32, an Lpd.receiving section 33 executes an Lpr/Lpd protocol between the foregoing Lpd transmitting section 17 of the network scanner 2 and the Lpd receiving section 33. A file receiving section 34 executes processing for receiving the image file from the network scanner 2 based on this Lpr/Lpd protocol procedure.

[0050] Moreover, in the network communication section 32, a search packet transmitting section 35 transmits a search packet on the network 1. A search response packet receiving section 36 receives a search response packet responded to this search packet.

[0051] An image file storage processing section 39 stores the image file 14 received by the file receiving section 34 to the storage section 15. The file managing section 13 manages the image file stored in the storage section 15.

[0052] Moreover, a registration packet transmitting section 37 generates a registration packet from user terminal information 41 managed by a user terminal information managing section 40, and transmits the generated registration packet to the network scanner 2. A registration response packet receiving section 38 receives a registration response packet responded to the registration packet.

[0053] An external application managing section 42 manages an external application 43, which is executed by PC3. This external application 43 includes an image viewer and an image edit application, such as a TIFF viewer and Adobe Photoshop (trademark of Adobe Corporation).

[0054] In place of the network scanner controller application 31 having such functions, a circuit equipped with the equivalent functions may be possible.

[0055] The Lpr/Lpd protocol used in communication between the network scanner 2 and PC3 is a communication protocol, which is used to transmit/receive print data between hosts using UNIX as OS. In this Lpr/Lpd protocol, the host, which wishes to

receive a print service, outputs a request to a line printer daemon (Lpd), which is executed on a certain host. The daemon, which has received the request, accepts it as a job, and queues it to perform processing.

[0056] FIG. 4 is a sequence diagram illustrating an image file transfer carried out between the network scanner and the personal computer according to the above embodiment.

As illustrated in FIG. 4, the sender's network scanner 2 transmits a command "Received Job" instructing the reception of a job (ST401). In response to this, if PC3 sends back ACK (ST402), the sender's network scanner 2 transmits a sub-command "Receive control file" instructing the reception of a control file (ST403). This sub-command includes the size and name of the control file.

[0057] In response to this, if PC3 sends back ACK (ST404), the network scanner 2 transmits the control file to PC3 (ST405). This control file includes a user name, a file name of an image file, and the like.

[0058] Next, if PC3 completes the reception of the control file and sends back ACK (ST406), the network scanner 2 transmits a sub-command "Receive data file" representing the transmission of the image file to PC3 (ST407). When confirming that PC3 has sent back ACK to the network scanner 2 (ST408), the network scanner 2 transmits an image file (TIFF file) (ST409). If the reception of the image file is completed, PC3 sends back ACK (ST410).

[0059] Since the Lpr/Lpd protocol used in the foregoing image file transfer is based on TCP, the transmission/reception of a command, a sub-command, a control file and a data file is carried out not on a packet basis but on a stream basis. In other words, a connection between the network scanner 2 and PC3 is established and then a communication is carried out. Such a communication protocol is referred to as a connection type communication protocol, and an ftp protocol can be used in addition thereto. Accordingly, in order to perform data transmission to PC3 from the network scanner 2, the network scanner 2 must know the IP address of PC3 at the transmitting time. Moreover, in order to register the IP address to address notebook data 24 together with the user name and the like, the IP address and other relevant information (hereinafter referred to as user terminal information) must be obtained.

[0060] The following will explain an IP address obtaining method at the network scanner according to the present embodiment. FIG. 5 is a flowchart illustrating a user terminal information registration operation carried out between the network scanner and the personal computer according to the above embodiment.

[0061] When the network scanner 2 starts up (ST501), the search packet receiving section 19 monitors a packet with a specific port number on the network 1 (ST502).

[0062] On the other hand, when PC3 starts up (ST503), and detects startup of the network scanner controller application 31 or reception of a search start action (instruction of user registration) (ST504), PC3 carries out search of the network scanner 2 on the network 1 in the following manner. First, the search packet transmitting section 35 broadcasts a search packet on the network 1 (ST505) and waits for a response (ST506).

[0063] FIG. 6 is a view showing a frame format of a search packet according to the above embodiment. A UDP packet is used as a search packet 60. At an IP header 61 of the search packet 60, a broadcast address (for example, 255.255.255.255) is specified in a destination address field and the IP address of PC3 is specified in a sender address field.

[0064] Moreover, at a UDP header 63, which is positioned at the top of an IP data field 62, the same port number that the search packet receiving section 19 of the network scanner 2 monitors is specified as a destination port number.

[0065] Still moreover, a UDP data field 64 includes various kinds of information indicating that this packet is a search packet. Namely, the UDP data field 64 includes information "Discovery" indicating that this packet relates to an automatic registration of user terminal information, information "REQ" indicating that this packet relates to a processing request, and information "Group" indicating a group name to which the sender of the packet belongs.

[0066] Since a UDP protocol is a connectionless type communication protocol that does not have to establish the connection, unlike the TCP protocol, it is suitable for searching the network scanner 2.

[0067] The search packet receiving section 19 of the network scanner 2 receives the search packet 60, recognizes information "Group", and determines whether or not this is

the group name to which a response should be given (ST507). For example, if the group name matches the name of a group to which the search packet receiving section 19 belongs, the search packet receiving section 19 determines that a response should be given. If they do not match each other, the search packet receiving section 19 determines that a response should not be given. In the case where it is determined that a response should not be given, the network scanner returns to a search packet waiting state without giving any response (ST508). On the other hand, in the case where it is determined that a response should be given, the search response packet transmitting section 20 sends back the search response packet to PC3 (ST509). In the case where PC3 transmits the search packet 60 including no information "Group", the network scanner 2 determines that this is the search from outside the group and gives a response without fail.

[0068] FIG. 7 is a view showing a frame format of a search response packet according to the above embodiment. A UDP packet is used as this search response packet 70. At an IP header 71 of the search packet 70, a sender of the search packet 60, that is, an IP address of PC3 (hereinafter referred to as PC IP address) is specified in a destination address field and an IP address of the network scanner 2 is specified in a sender address field.

[0069] Moreover, at a UDP header 73, which is positioned at the top of an IP data field 72, the same port number that the search response packet receiving section 36 of PC 3 monitors is specified as a destination port number.

[0070] Still moreover, a UDP data field 74 includes various kinds of information indicating that this packet is a search response packet. Namely, in the search packet 60 shown in FIG. 6, information "ACK" indicating that the packet relates to a processing response is used in place of information "REQ" indicating that the packet relates to a processing request.

[0071] When PC3 receives the search response packet 70, the registration packet transmitting section 37 of PC3 transmits the registration packet to the network scanner 2.

FIG. 8 is a view showing a frame format of a registration packet according to the above embodiment. A UDP packet is used as this registration packet 80. At an IP

header 81 of the registration packet 80, the IP address of the network scanner 2 that has sent back the search response packet 70 is specified in the destination address field. Moreover, an IP address of PC3 is specified in the sender address field.

[0072] Moreover, at a UDP header 83, which is positioned at the top of an IP data field 82, the same port number that the registration packet receiving section 21 of the network scanner 2 monitors is specified as a destination port number.

[0073] Still moreover, a UDP data field 84 includes information "USER" indicative of a user name, information "Lease period" indicative of an effective time (lease period) of user terminal information (particularly, an IP address), and information "Password" indicative of a password specified by the user, in addition to information "Discovery", "REQ" and "Group".

[0074] When the registration packet receiving section 21 of the network scanner 2 receives the registration packet 80, the address notebook managing section 23 extracts user terminal information from the registration packet 80 (ST511), and registers it to the address notebook data 24 (ST512). Thereafter, the registration response packet transmitting section 22 transmits a registration response packet 90 to PC3 to inform that registration has been completed (ST513).

[0075] FIG. 9 is a view showing a frame format of a registration response packet according to the above embodiment. A UDP packet is used as this registration packet 90. At an IP header 91 of the registration packet 90, a sender of the registration packet 80, that is, a PC IP address is specified in the destination address field. Moreover, an IP address of the network scanner 2 is specified in the sender address field.

[0076] Moreover, at a UDP header 93, which is positioned at the top of an IP data field 92, the same port number that the registration response packet receiving section 38 of PC3 monitors is specified as a destination port number.

[0077] Still moreover, a UDP data field 94 includes various kinds of information indicating that this packet is a registration response packet. Namely, in the registration packet 80 shown in FIG. 8, information "ACK" indicating that the packet relates to a processing response is used in place of information "REQ" indicating that the packet relates to a processing request.

[0078] A further explanation will be given of the operations of the network scanner 2 and PC3 in the foregoing flow of the user terminal information registration.

FIG. 10 is a flowchart illustrating steps for search processing of the network scanner performed by the personal computer according to the above embodiment.

[0079] PC3 resets a search retransmission counter to zero (STST1001). Next, PC3 determines whether or not the search retransmission counter exceeds a maximum number of search retransmission times (ST1002). Since the search retransmission counter = 0 at first, the determination result is "NO" and processing goes to ST1003. In ST1003, PC3 broadcasts the search packet 60 on the network 1. Next, PC 3 obtains a transmission start time from a built-in timer of PC3 (STST1004). After that, PC 3 determines whether or not a current time (obtained from the built-in timer) is greater than a sum of the transmission start time and a total amount of search response waiting time, that is, whether or not a predetermined total amount of search response waiting time has elapsed from the broadcast transmission (ST1003) (ST1005).

[0080] In the case where the result in ST1005 is "NO", PC3 waits for reception of the search response until the predetermined search response waiting time per one time elapses (ST1006). PC3 determines whether or not the search response packet 70 is received while waiting for the reception (ST1007). In the case where the determination result is "YES", PC3 determines whether or not the received search response packet 70 is one that responds to the search packet 60 transmitted by PC3 (ST1008). This can be carried out by, for example, determining whether or not information in the UDP data field of the search response packet 70 is "Discovery" and the processing response is "ACK" or not. In the case where the determination result is "YES", the IP address of network scanner 2 obtained from the search response packet 70 is registered to a response table (ST1009). After registration, processing goes back to ST1005.

[0081] If the determination result is "NO" in ST1008, the received search response packet 70 is not one that responds to the search packet 60 transmitted by PC3. Then, the search response packet 70 is abandoned and processing goes back to ST1005.

[0082] In the case where the determination result is "NO" in ST1007, that is, no search response packet 70 is received, PC3 determines whether or not the response table is empty (ST1010). Here, in the case where the determination result is "YES", the

search packet 60 might have disappeared on the network 1 and has not reached any network scanner 2 for some reason. In order to retransmit the search packet 60, the search retransmission counter is incremented by one (ST1011) and processing goes back to ST1002. Sequentially, after determining whether or not the search retransmission counter exceeds the maximum value in ST1002, processing from ST1003 to ST1009 is repeated. Accordingly, the retransmission of the search packet 60 is carried out up to the maximum number of the search retransmission times.

[0083] On the other hand, if the determination result in step ST1010 is "NO", the search packet 60 is effectively transmitted, and processing goes back to ST1005. Then, processing from ST1006 to ST1009 is repeated, and PC3 waits for a response from the network scanner 2 until a time that has elapsed from the broadcast transmission (ST1003) reaches the total amount of search response waiting time.

[0084] In this way, PC3 can search all available network scanners 2 on the network 1, and obtain the corresponding IP addresses. Moreover, PC3 can search the network scanners 2 without fail even if the search packet disappears or delay in response time of the network scanner 2 occurs.

[0085] An explanation will be given of the operation of the network scanner 2 while PC3 searches the network scanner 2 on the other hand.

FIG. 11 is a flowchart illustrating steps for responding to the search from the personal computer performed by the network scanner according to the above embodiment.

[0086] The network scanner 2 normally waits for the reception of the search packet 60 from PC3 (ST1101). If the network scanner 2 receives the packet (ST1102), the network scanner 2 checks whether or not the received packet is search packet 60 (ST1103). If information "Discovery" and "REQ" are included in the received packet as illustrated in FIG. 6, the network scanner 2 determines that the received packet is the search packet 60.

[0087] If the received packet is the search packet 60 (YES) in ST1103, the network scanner 2 recognizes the group name of PC3 from information "Group" included in the search packet 60, and checks whether or not the group name matches the name of the group to which the network scanner 2 belongs (ST1104). If they match each other

(YES), the network scanner 2 prepares the search response packet 70 including the IP address of the network scanner 2 and transmits it to PC3 (ST1105). If they do not match each other (NO), the network scanner 2 checks whether or not the search packet 60 includes information "Group" (ST1106). If the search packet 60 does not include information "Group" (YES), the network scanner 2 determines that this is the search from outside the group, and processing moves to ST1105 to transmit the search response packet 70. While, if the result is NO, the network scanner 2 abandons the packet and goes back to ST1101. In this way, the network scanner 2 responds to the search from PC3 and notifies PC3 of the IP address of the network scanner 2.

[0088] An explanation will be next given of steps for registering user terminal information to the network scanner 2 performed by PC3.

FIG. 12 is a flowchart illustrating steps for registering user terminal information to the network scanner in the personal computer according to the above embodiment.

[0089] PC3 determines whether or not a response table is empty (ST1201). If it is empty (YES), PC3 ends the registration steps (ST1202). If it is not empty (NO), PC3 extracts the IP address (registration destination) of a first network scanner 2 from the top of the response table (ST1203). Next, PC3 resets a registration retransmission counter to zero (ST1204). After that, PC3 determines whether or not the registration retransmission counter exceeds a maximum number of registration retransmission times (ST1205). If the determination result is NO, PC3 prepares and transmits a registration packet 80 shown in FIG. 8 (ST1206).

[0090] After transmitting the registration packet 80, the PC3 obtains a transmission start time from the built-in timer of PC3 (ST1207). Next, PC 3 determines whether or not a current time is greater than a sum of the transmission start time and a total amount of registration response waiting time, that is, whether or not a predetermined total amount of registration response waiting time has elapsed from the start of transmission (ST1208).

[0091] In the case where the result in ST1208 is "NO", PC3 waits for a registration response packet 90 from the network scanner 2 until the predetermined registration response waiting time per one time elapses (ST1209). After that, PC3 determines whether or not the registration response packet 90 is received (ST1210). If the

determination result is "YES", PC3 determines whether or not the registration response packet 90 is one that responds to the registration packet 80 transmitted by PC3 (ST1211). If the determination result is "YES" in ST1211, PC3 extracts the IP address of network scanner 2, which has responded, from the registration response packet 90, and registers it to a registration destination table (ST1212). After deleting the registration destination from the registration destination table (ST1213), processing goes back to ST1201 to move to the steps for registering user terminal information to a next registration destination.

[0092] On the other hand, if the determination result is "NO" in ST1210, since there is a possibility that the registration packet 80 has disappeared, the registration retransmission counter is incremented by one (ST1214), and processing goes back to ST1205. Then, PC3 confirms whether or not the registration retransmission counter exceeds the maximum number, retransmits the registration packet 80, and repeats processing from steps 1206 to 1212. Moreover, in the case where the determination result is "NO" in ST1211, PC3 abandons the registration response packet 90, goes back to ST1208, and repeats processing from ST1209 to 1212. As described above, there is a case in which the value of the registration retransmission counter exceeds the maximum number of registration retransmission times in ST1205. Or, there is a case in which an elapsed time from the transmission of registration packet exceeds the total amount of registration response waiting time in ST1208. In either case, the registration destination is in a state that it cannot response due to power-down of the registration destination and the like. In this case, PC3 abandons the registration to the registration destination and moves to steps for registration to a next registration destination. In this way, PC3 performs the registration of the user terminal information to all registration destinations registered in the response table.

FIG. 13 is a flowchart illustrating steps for responding to the user registration from the personal computer performed by the network scanner according to the above embodiment.

[0093] The network scanner 2 normally waits for the reception of the registration packet 80 from PC3 (ST1301). If the network scanner 2 receives the packet (ST1302), the network scanner 2 checks whether the received packet is the registration packet 80

or not (ST1303). If information "Discovery", "REQ", "USER" and the like are included in the received packet as illustrated in FIG. 8, the network scanner 2 determines that the received packet is the registration packet 80.

[0094] If the received packet is the registration packet 80 (YES) in ST1303, the network scanner 2 recognizes the group name of PC3 from information "Group" included in the registration packet 80, and checks whether or not the group name matches the name of the group to which the network scanner 2 belongs (ST1304). If they match each other (YES), processing goes to ST1305. If they do not match each other (NO), the network scanner 2 checks whether or not information "Group" is included in the registration packet 80 in ST1306. If it is not included therein (YES), the network scanner 2 determines that this is the request for registering user terminal information from outside the group, and processing moves to ST1305.

[0095] In ST1305, the network scanner 2 searches the address notebook data 24 using information "USER" included in the registration packet 80, and checks whether or not the same user name is already registered. If the result is "NO", the network scanner 2 newly registers user terminal information extracted from the registration packet 80, such as a user name, a PC IP address, a group name, a password and the like to the address notebook data 24 (ST1307).

[0096] On the other hand, if the result is "YES" in ST1305, the network scanner 2 checks whether or not the user name and password, which are already registered as user terminal information, match the user name and password, which are indicated by each of information "USER" and "Group" included in the registration packet 80 (ST1308). If the result is "YES" in ST1308, the network scanner 2 determines that both are the same and overwrites the existing user terminal information in the address notebook data 24 using the user terminal information extracted from the registration packet 80 (ST1309). On the other hand, if the result is "NO" in ST 1308, the network scanner 2 determines that both are not the same and newly registers the user terminal information to the address notebook data 24 (ST1307). This prevents the user terminal information from being erroneously overwritten.

When the registration in ST1307 and ST1309 is ended, the network scanner 2 prepares and transmits the registration response packet 90 (ST1310), and returns to a

reception waiting state for the registration packet 80 (ST1301). As is appreciated from the foregoing description, the network scanner 2 can extract the user terminal information upon receiving the registration packet 80 from PC3, and newly register the extracted user terminal information to address notebook data or update it.

[0097] The following will explain the steps in which the network scanner 2 scans a document and transmits digital image data to PC3 using the user terminal information registered to the network scanner 2 from PC3 as described above.

FIG. 14 is a flowchart illustrating steps for transmitting digital image data between the network scanner and the personal computer according to the above embodiment.

[0098] First, the network scanner 2 selects whether or not the address notebook is used in order to specify a transmission destination of the digital image data (ST1401). The network scanner 2 carries out this selection by, for example, selecting an address notebook option from a menu. In the case where the use of the address notebook is selected in ST1401 (YES), for example, the network scanner 2 displays user names registered in the address notebook data 24 on an LCD provided to the control panel 25, and instructs the user to select a user name (ST1402). If the user name is selected, the IP address of PC3 registered in the address notebook data 24 to be associated with this user name is called up and specified as a destination.

[0099] Sequentially, the network scanner 2 determines whether or not a password is registered to be associated with the specified IP address (ST1403). If the result is YES, the network scanner 2 displays a message of a request for inputting a password on the LCD, and waits for the entry of a password (ST1404). If the password is input, the input password is checked against the password registered in the address notebook data 24 (ST1405). If both match each other (YES), processing goes to ST1406. If both do not match each other (NO), processing is ended. If no password is registered in ST1403 (NO), processing also goes to ST1406.

On the other hand, if the result is "NO" in ST1401, the user directly enters the IP address of the destination using a key provided on the control panel section 25 (ST1407) and processing goes to ST1406.

[0100] In ST1406, the scanner section 11 of the network scanner 2 scans the document and obtains image information. Sequentially, the image file generating

section 12 converts the image information into an image file in a TIFF format (ST1408). After that, the network scanner 2 transfers the image file to PC3 as a specified destination according to the Lpr/Lpt protocol (ST1409) as described above. In PC3 that has received the image file, the image file storage processing section 39 stores the image file to the storage section 15 (ST1410).

[0101] As explained above, according to the embodiment of the present invention, PC3 only has to start up the network scanner controller application 31 or the user only has to carry out the search starting action, in order to automatically register user terminal information including the IP address of PC3 to the network scanner 2 without checking the IP addresses of PC3 and the network scanner 2. This makes it possible for the user to easily register the user terminal information of PC3 to the network scanner 2 without fail even if the user has a poor knowledge of the PC or network. After finishing the registration, the IP address of the destination is called up from the address notebook data 24 of the network scanner 2 to instruct the scanner section 11 to scan the document, so that the image information can be transmitted to PC3 and stored. This makes it possible to save time and effort to input the IP address at a document scanning time.

[0102] Moreover, information "Password" is included in user terminal information to be contained in the registration packet 80. Then, the IP address and password are registered in the address notebook data 24 of the network scanner 2 to be associated with each other. The passwords are checked (ST1403 to ST1405) before the start of scanning the document (ST1406) as illustrated in FIG. 14, and the scanning of the document is allowed only when the passwords match each other. This makes it possible to prohibit the image file to be freely transmitted to PC3.

[0103] Still moreover, information "USER" is included in the user terminal information of the registration packet 80 and the IP address and user name are registered in the address notebook data 24 of the network scanner 2 to be associated with each other. Then, the user can call up the IP address from the address notebook data 24 based on the user name in place of the IP address, which is identified with difficulty at the document scanning time, so that the operation can be easily carried out.

[0104] Still moreover, in ST1305 of FIG. 13, if the user name specified in the registration packet 80 already exists in the address notebook data 24, the passwords are compared with each other (ST1208). Then, the user terminal information is overwritten only when both match each other, and this prevents correct user terminal information from disappearing due to erroneous overwriting.

[0105] Still moreover, information "Group" is included in the search packet 60 and the registration packet 80, so that the response and registration are carried out only when the network scanner 2 and PC3 belong to the same group. Thereby, when a plurality of network scanners 2 are provided in one office, for example, these network scanners 2 can be selectively used according to a group to which a user belongs. Also, this eliminates the user's need to have consciousness about this selective use at the time of registering user information.

[0106] The present invention may be implemented using a commercially available general digital computer and a microprocessor, which are programmed according to the technology described in the above embodiment, as it is apparent to those skilled in the art. Further, the present invention includes software made by those skilled in the art based on the technology described in the above embodiment, as it is apparent to those skilled in the art.

[0107] The present invention further includes a computer program product which is a storage medium including instructions which can be used to program a computer that embodies the present invention. The storage medium may be, but not limited to, any type of disks including a floppy disk, an optical disc, a CD-ROM, and a magneto-optical disk, ROM, RAM, EPROM, EEPROM, a magnetic or optical card, and the like.

[Effects of the Invention]

[0108] As explained above, according to the present invention, the user terminal apparatus broadcasts the search signal, recognizes the IP address of the scanner apparatus from the response signal, which responds to the search signal and which is transmitted from the scanner apparatus. Then, the user terminal apparatus transmits the user terminal information including the IP address of user terminal apparatus, thereby making it possible to instruct the scanner apparatus to register the user terminal information. Thus, the user can easily and surely register the user terminal information

to the scanner apparatus without checking the IP addresses of the user terminal apparatus and the scanner apparatus, even if the user has a poor knowledge of IT (Information Technology). After finishing the registration, the IP address is called up from memory of the scanner apparatus to instruct the scanner apparatus to scan the document, so that image information can be transmitted and stored to the user terminal apparatus to which this IP address is assigned. This makes it possible to save time and effort to input the IP address at a document scanning time.

[Brief Description of the Drawings]

FIG. 1 is a schematic view illustrating a network system where a network scanner operates according to one embodiment of the present invention;

FIG. 2 is a block diagram illustrating functions of the network scanner according to the above embodiment;

FIG. 3 is a block diagram illustrating functions of a personal computer according to the above embodiment;

FIG. 4 is a sequence diagram illustrating an image file transfer carried out between the network scanner and the personal computer according to the above embodiment;

FIG. 5 is a flowchart illustrating a user terminal information registration operation carried out between the network scanner and the personal computer according to the above embodiment;

FIG. 6 is a view showing a frame format of a search packet according to the above embodiment;

FIG. 7 is a view showing a frame format of a search response packet according to the above embodiment;

FIG. 8 is a view showing a frame format of a registration packet according to the above embodiment;

FIG. 9 is a view showing a frame format of a registration response packet according to the above embodiment;

FIG. 10 is a flowchart illustrating steps for search processing of the network scanner performed by the personal computer according to the above embodiment;

FIG. 11 is a flowchart illustrating steps for responding to the search from the personal computer performed by the network scanner according to the above embodiment;

FIG. 12 is a flowchart illustrating steps for registering user terminal information to the network scanner in the personal computer according to the above embodiment;

FIG. 13 is a flowchart illustrating steps for responding to the user registration from the personal computer performed by the network scanner according to the above embodiment; and

FIG. 14 is a flowchart illustrating steps for transmitting digital image data between the network scanner and the personal computer according to the above embodiment.

[Description of the Numerical Characters]

1. Network
2. Network scanner
3. Personal computer
- 11 Scanner section
- 12 Image file generating section
- 13 File managing section
- 14 Image file
- 15 Storage section
- 16 Network communication section
- 17 Lpd transmitting section
- 18 File transmitting section
- 19 Search packet receiving section
- 20 Search response packet transmitting section
- 21 Registration packet receiving section
- 22 Registration response packet transmitting section
- 23 Address notebook managing section
- 24 Address notebook data
- 25 Control panel section
- 31 Network scanner controller application

- 32 Network communication section
- 33 Lpd receiving section
- 34 File receiving section
- 35 Search packet transmitting section
- 36 Search response packet receiving section
- 37 Registration packet transmitting section
- 38 Registration response packet receiving setion
- 39 Image file storage processing section
- 40 User terminal information managing section
- 41 User terminal information
- 42 External application managing section
- 43 External application
- 60 Search packet
- 70 Search response packet
- 80 Registration packet
- 90 Registration response packet

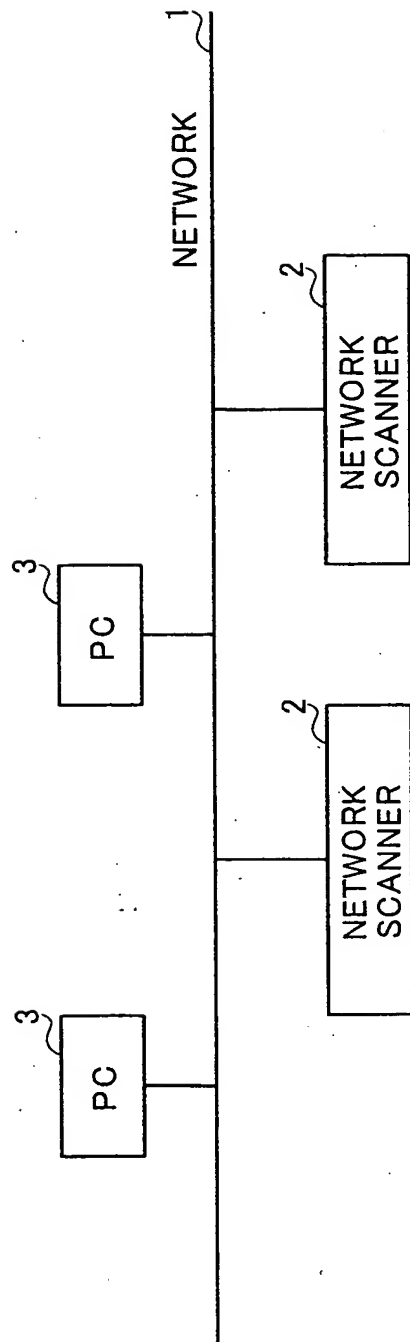


FIG.1

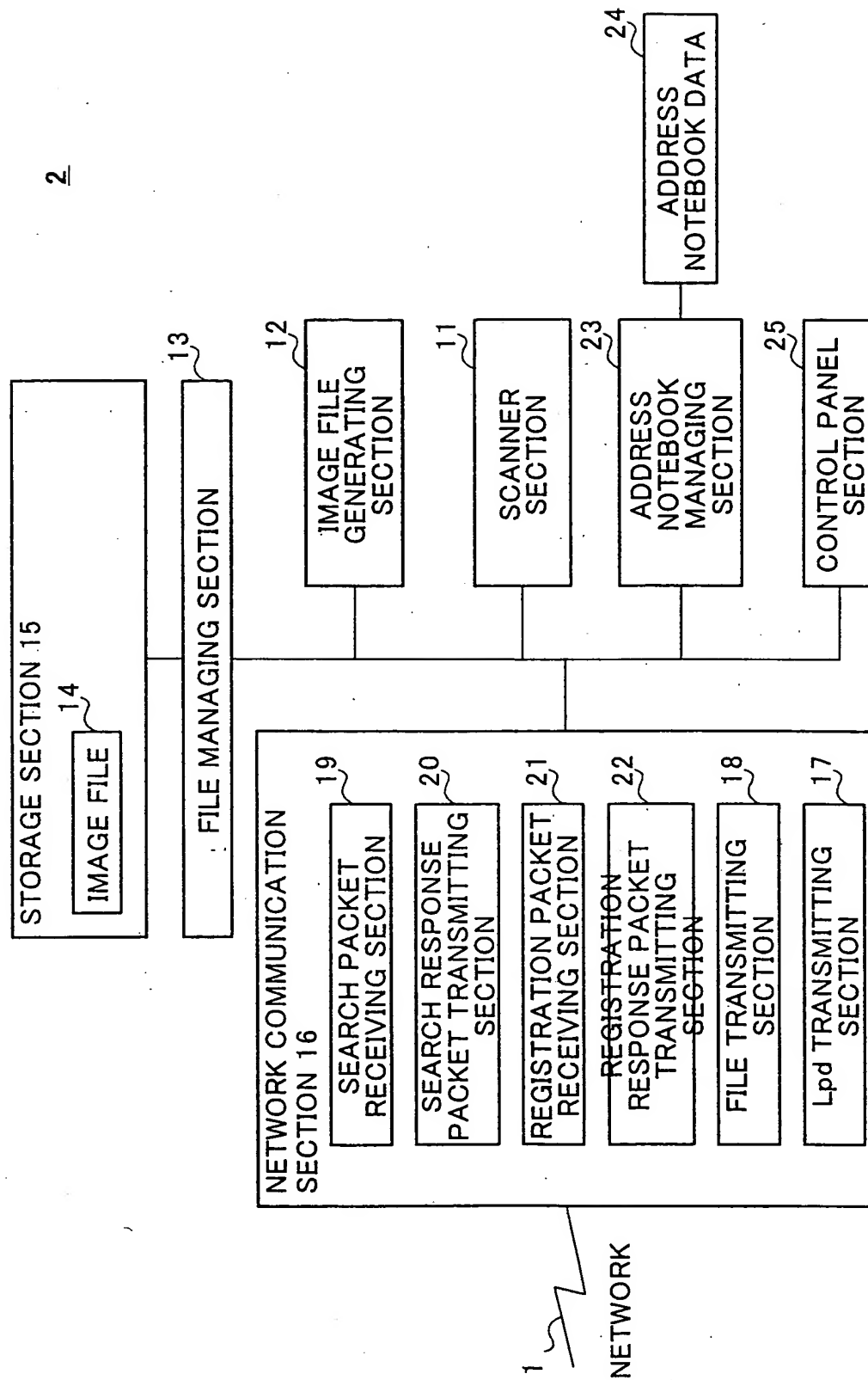


FIG.2

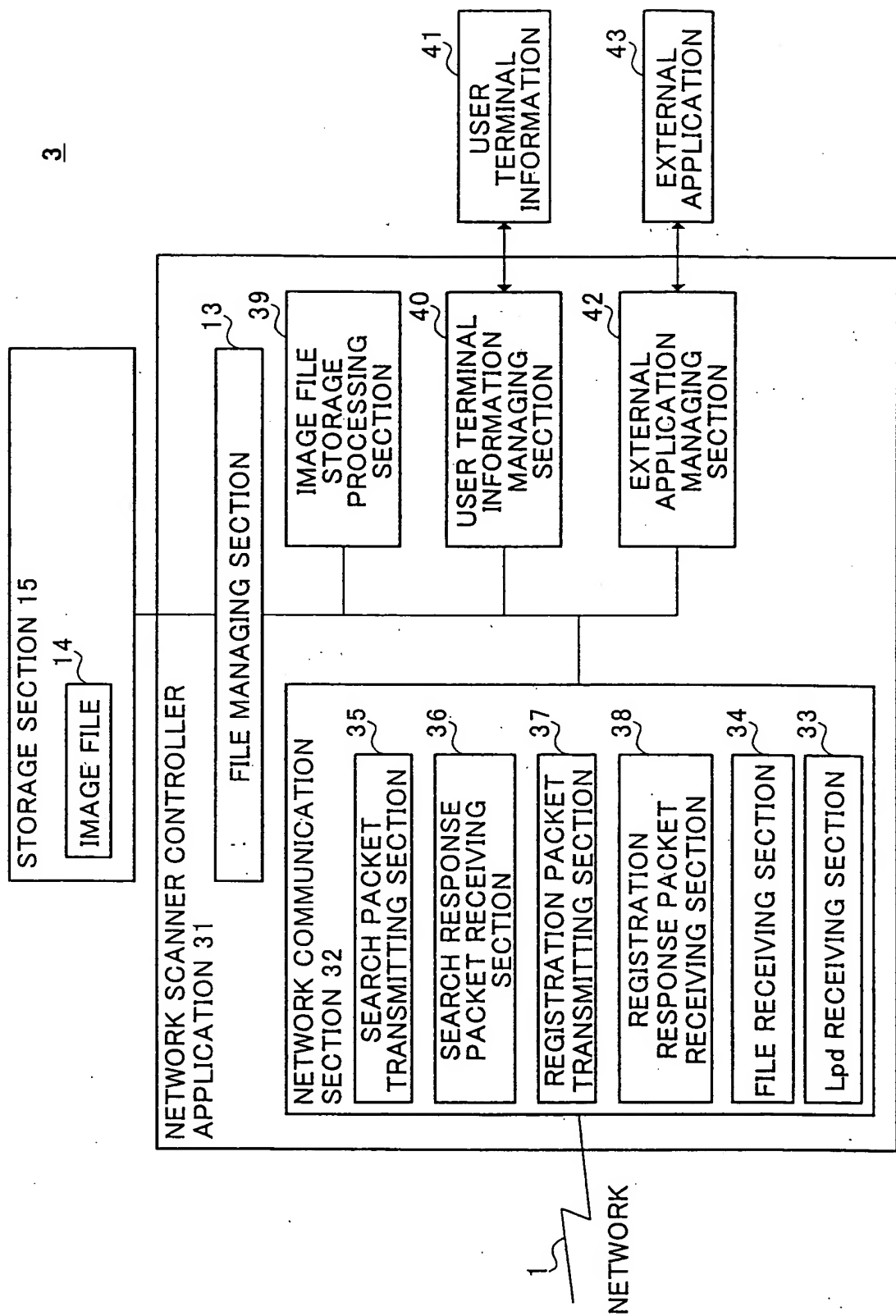


FIG.3

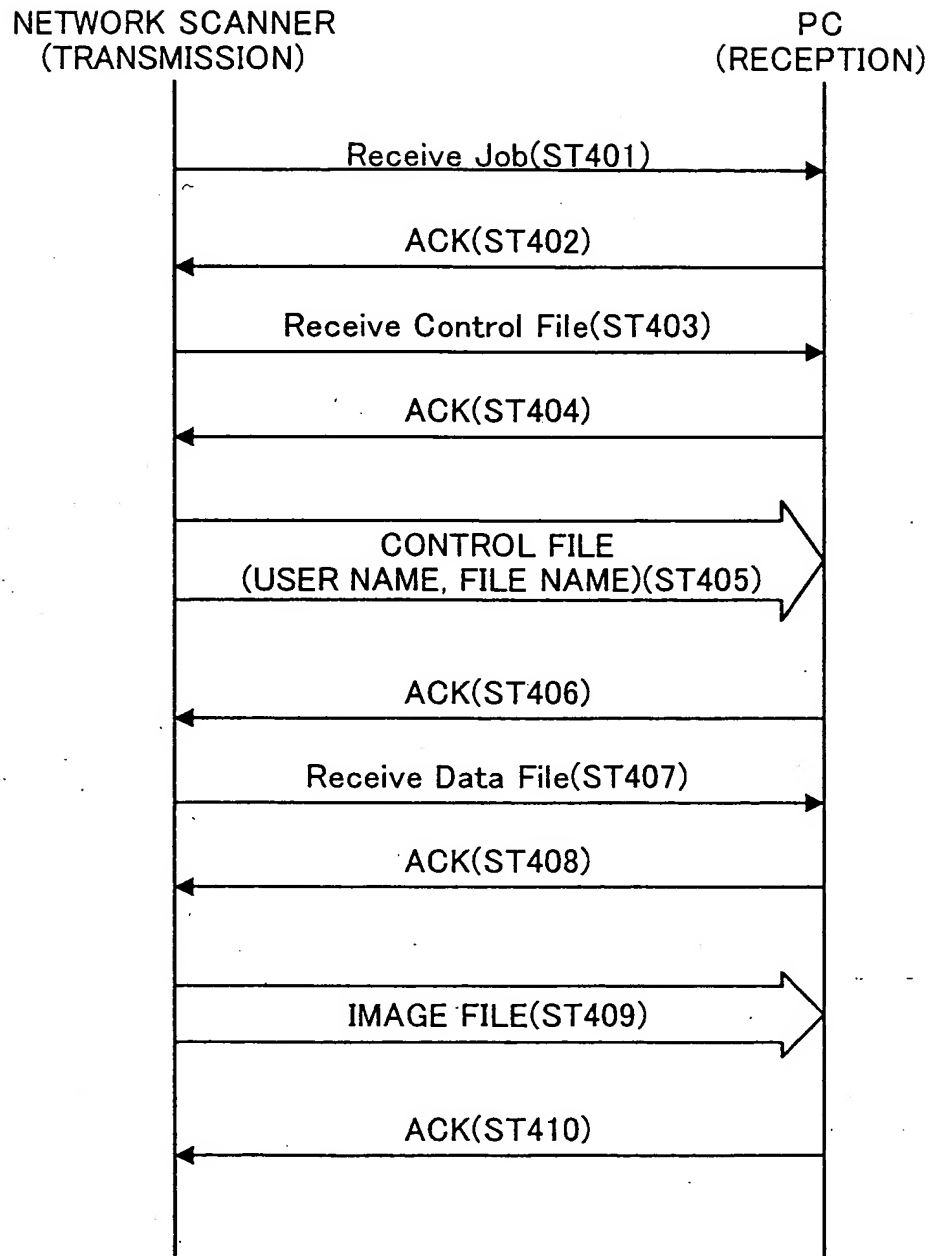


FIG.4

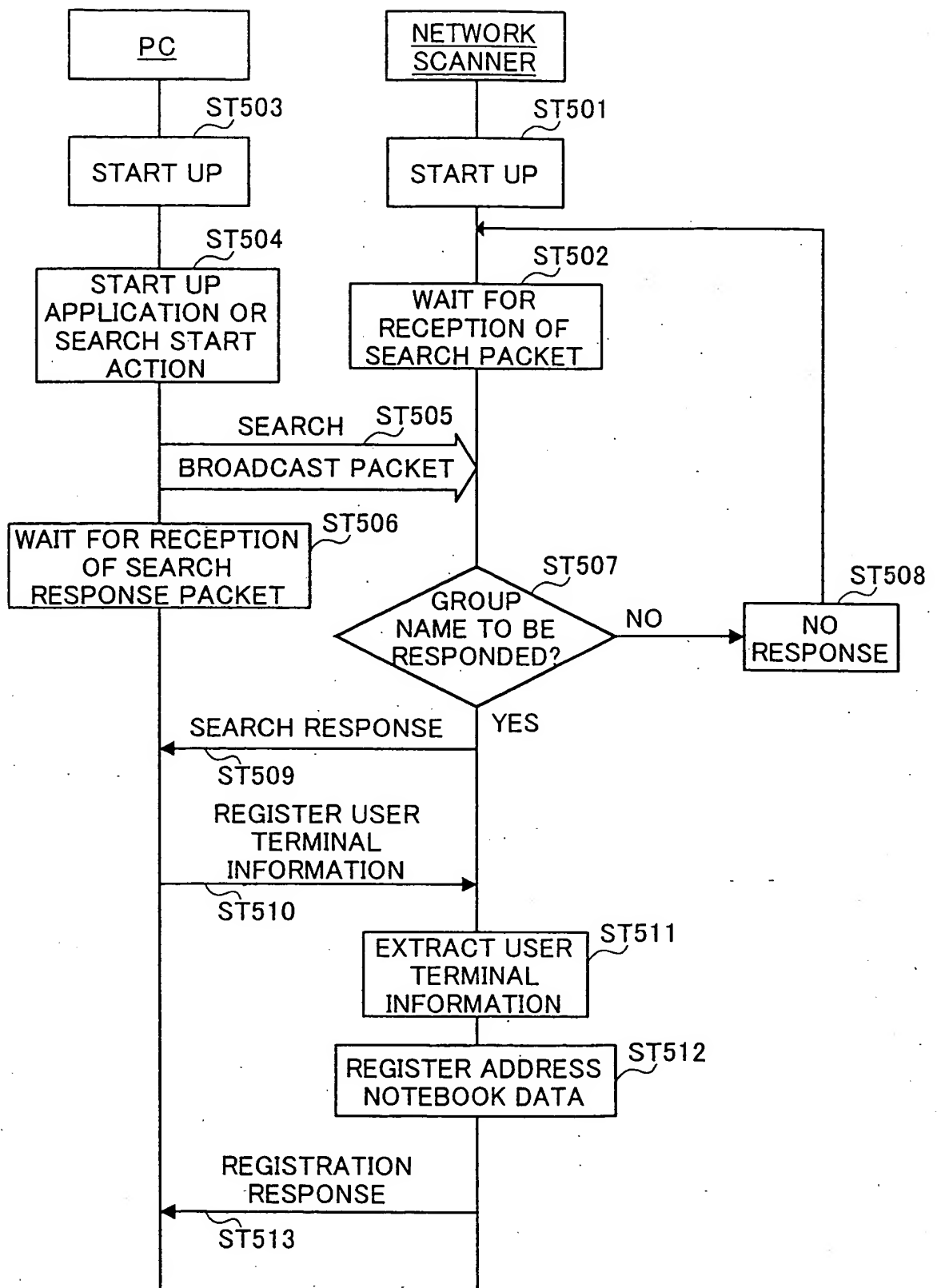


FIG.5

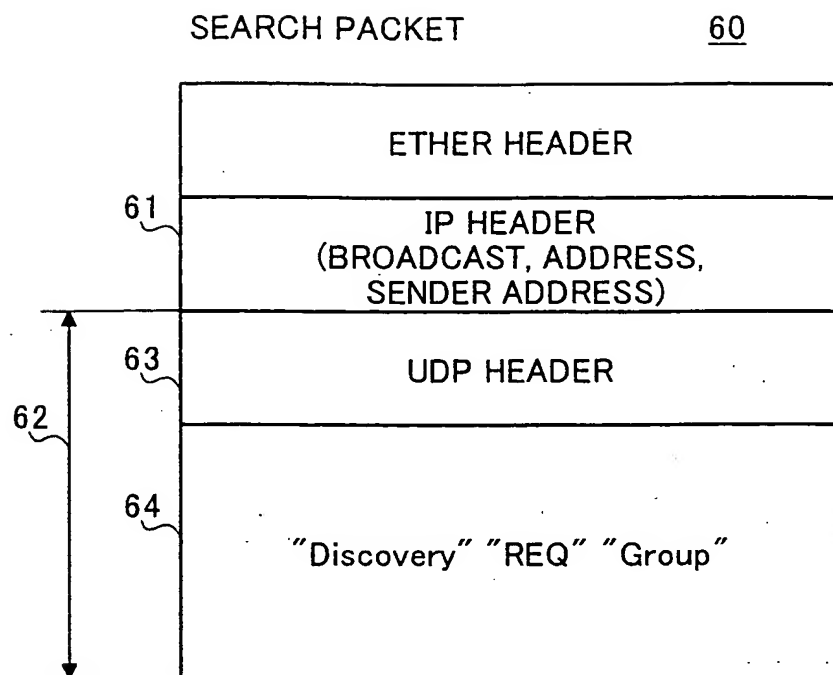


FIG.6

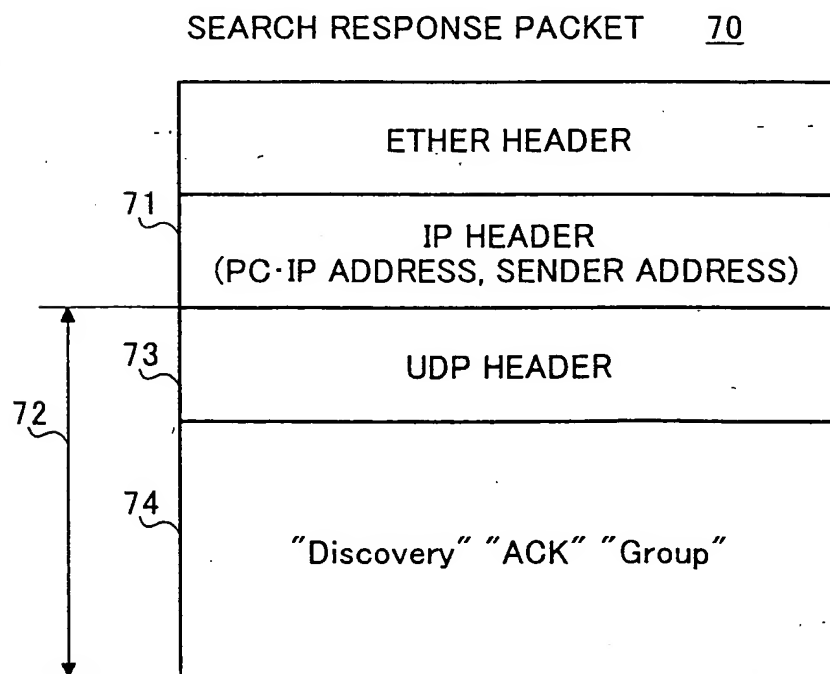


FIG.7

REGISTRATION PACKET

80

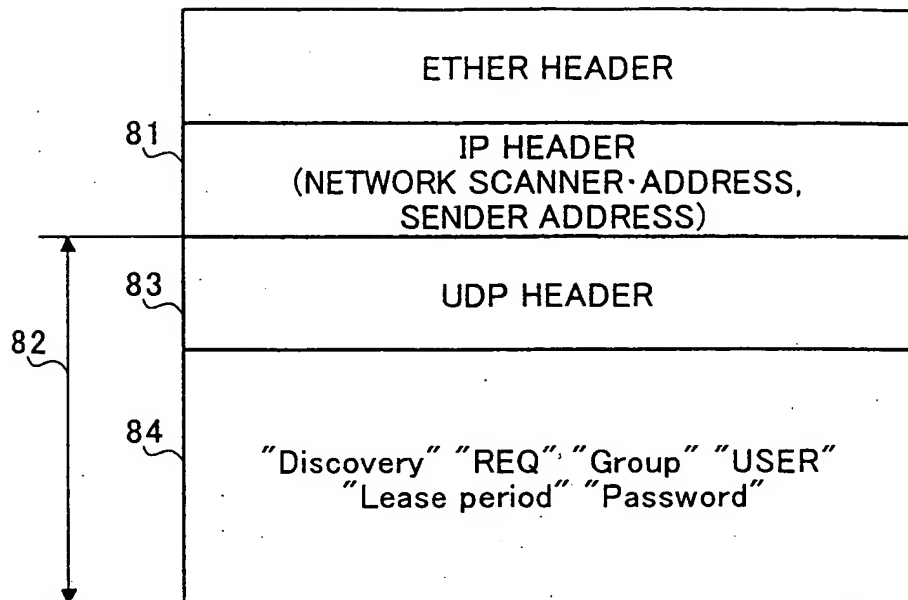


FIG.8

REGISTRATION RESPONSE PACKET 90

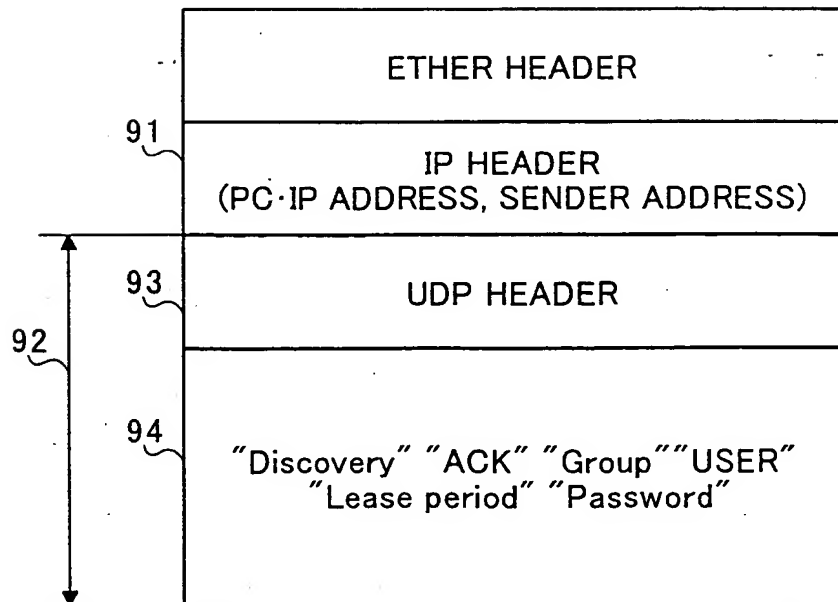


FIG.9

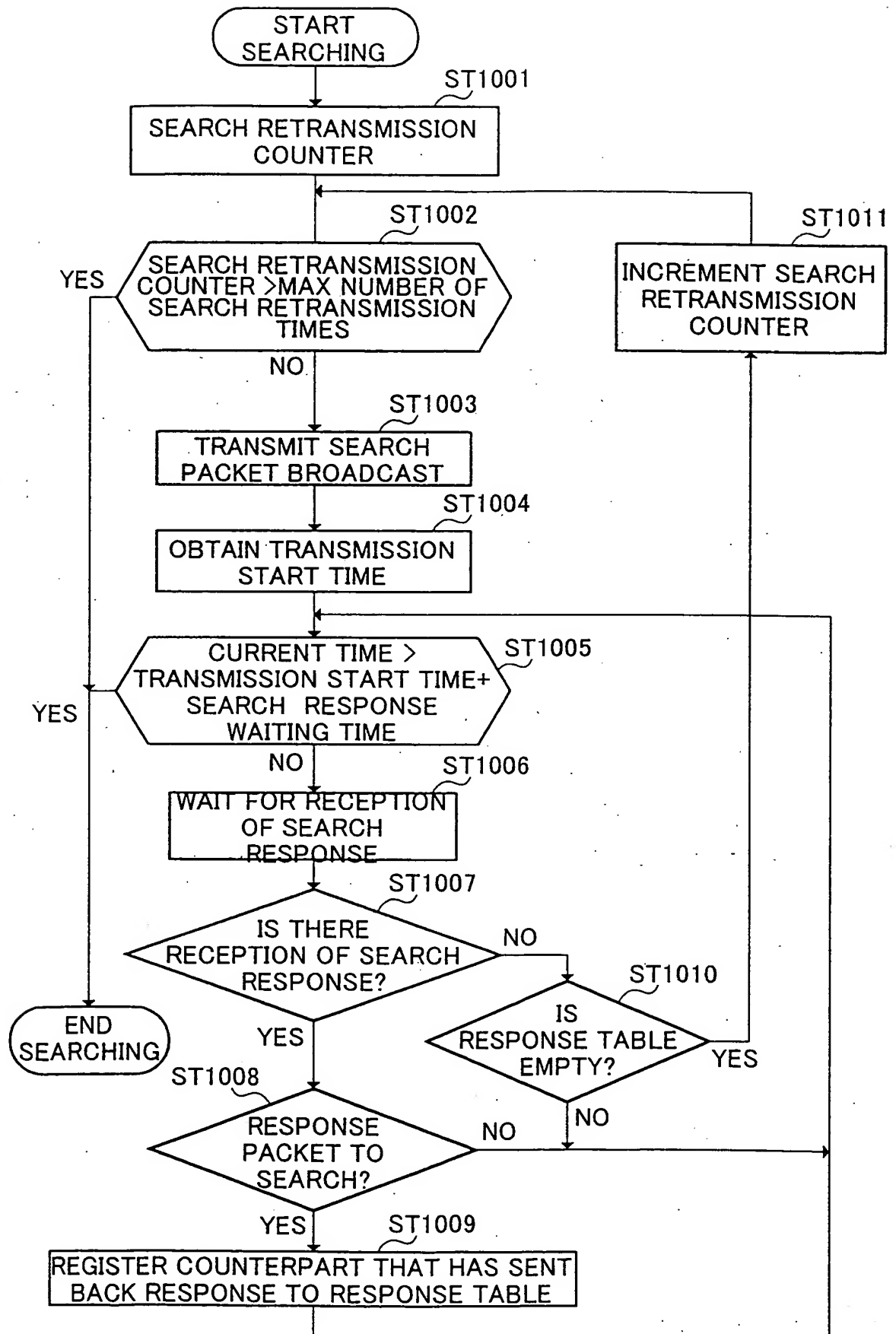


FIG.10

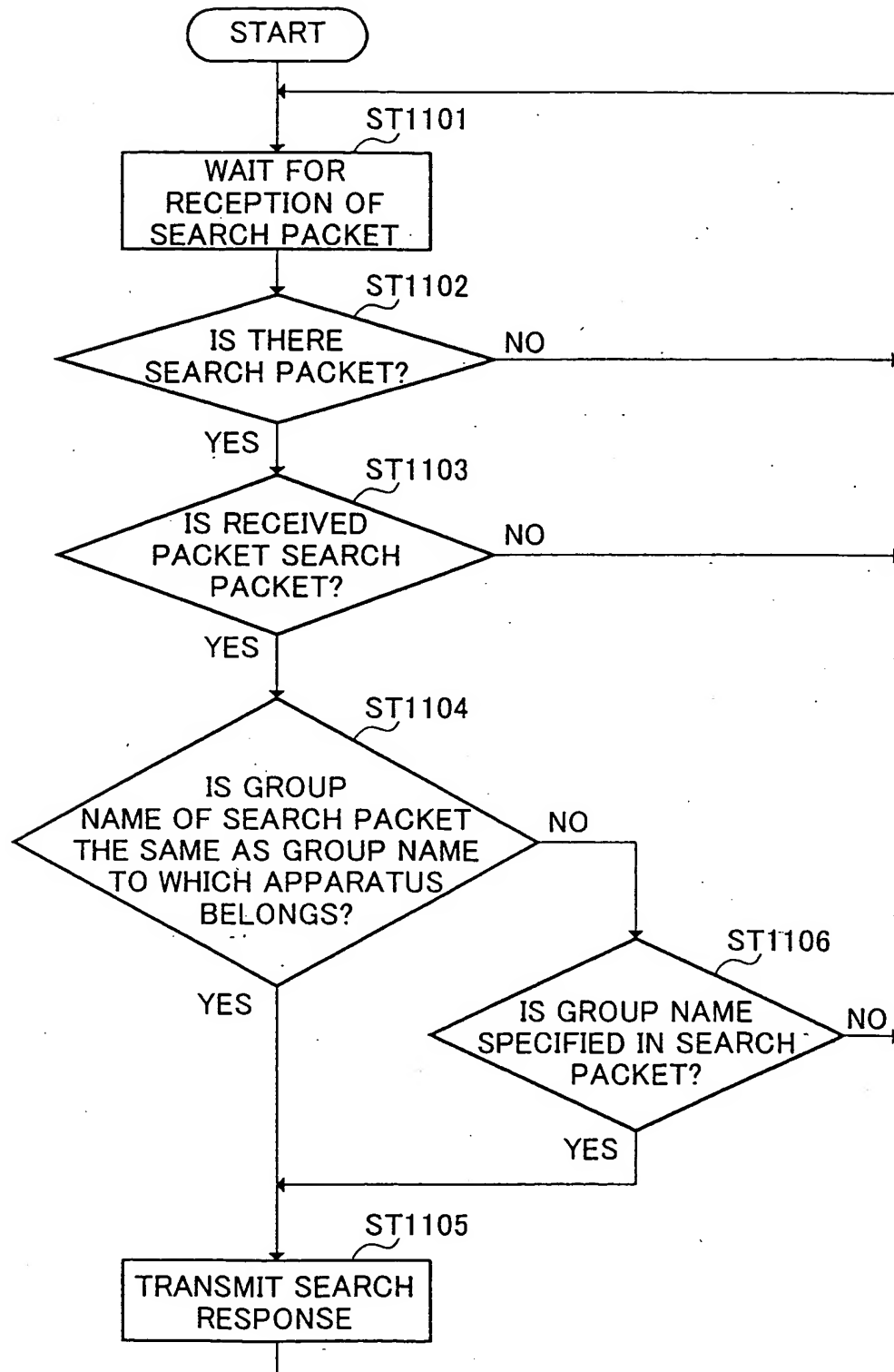


FIG.11

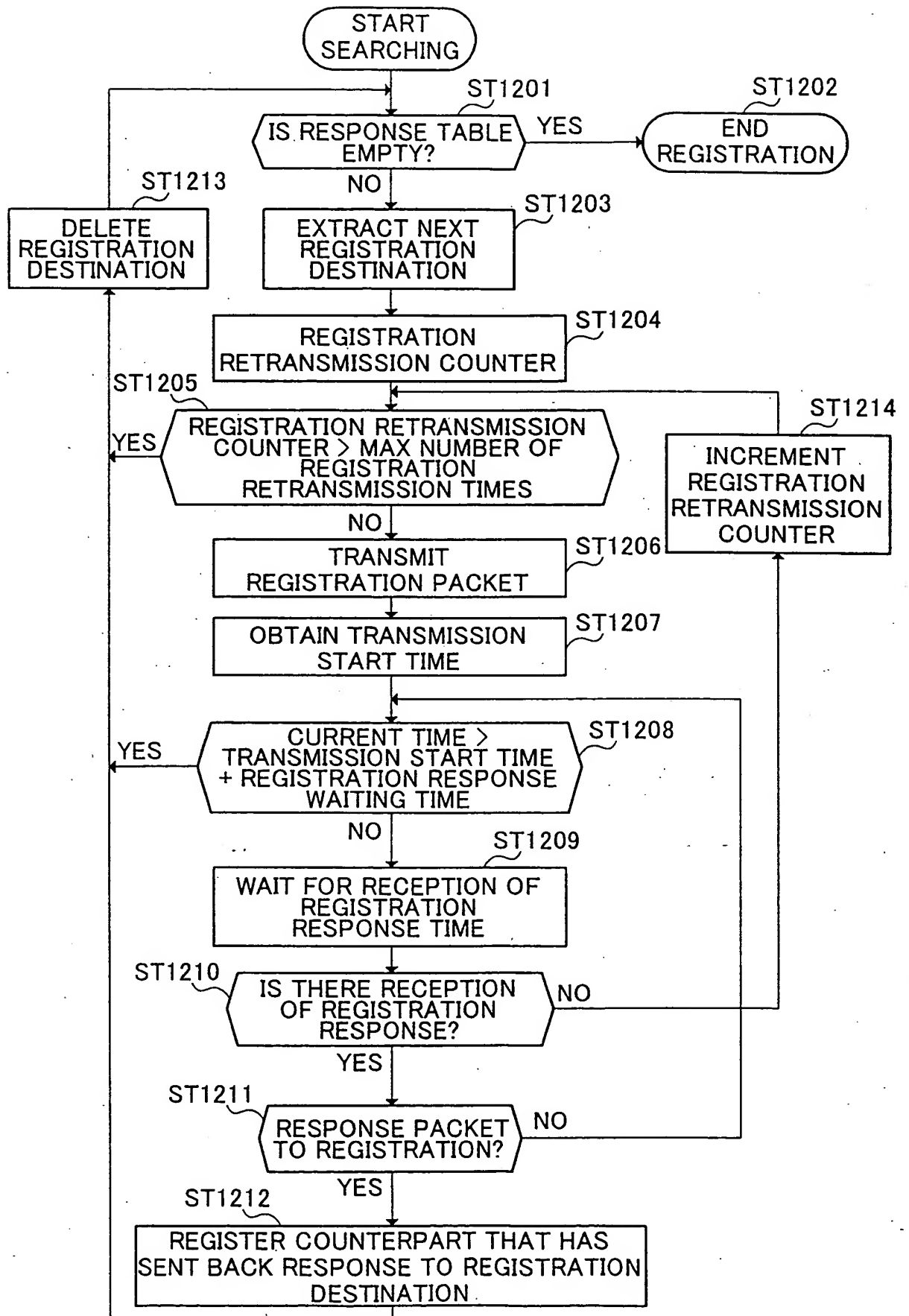


FIG.12

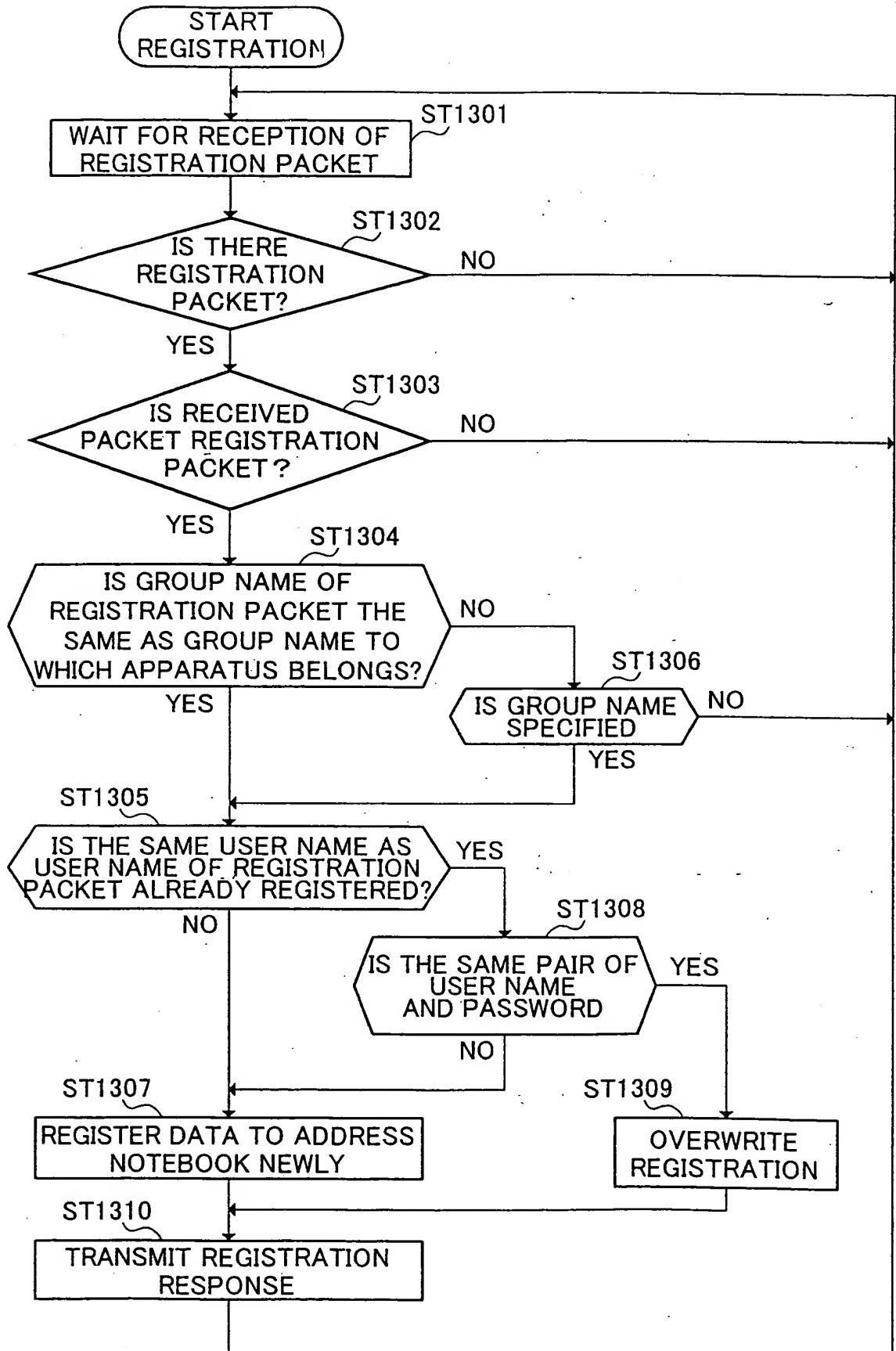


FIG.13

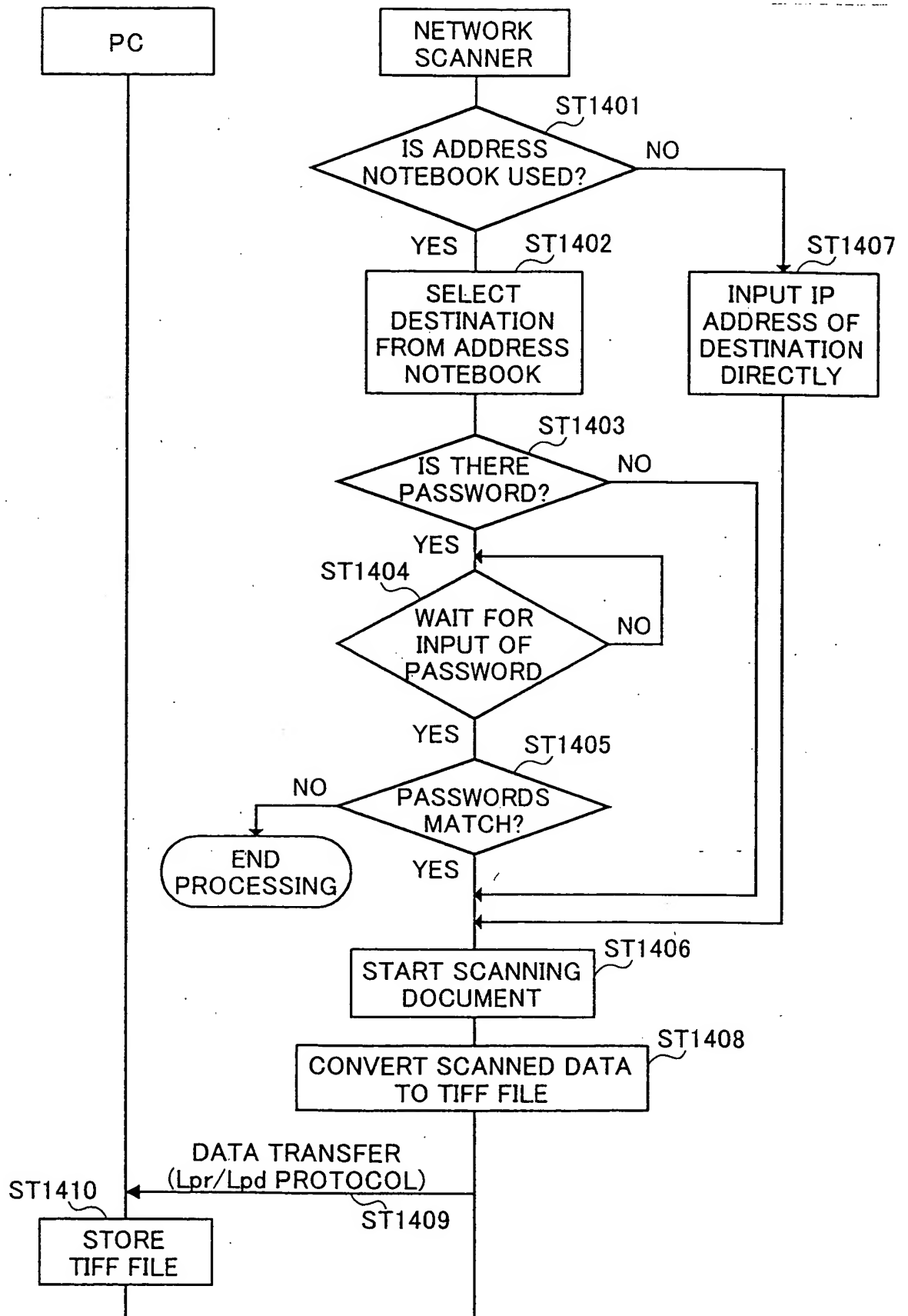


FIG.14

[Document Name] Abstract

[Abstract]

[Object] To provide an image information transmitting system that allows easy registration of user terminal information, such as an IP address of a user terminal apparatus

[Solution] PC broadcasts a search packet on a network (ST505), and waits for a response (ST506). A network scanner receives the search packet and determines whether or not the received search packet has a group name to be responded (ST507). When determining it as the group name to be responded, the network scanner sends back a search response packet to PC (ST509). When receiving the search response packet, PC transmits a registration packet to the network scanner. When receiving the registration packet, the network scanner extracts user terminal information from the registration packet (ST511) and registers it to address notebook data (ST512). After that, the network scanner transmits a registration response packet to PC (ST513).

[Selected Drawing] FIG. 5

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